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Successful Methods

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BREAKING GROUND FOR THE BIG FIGHT

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No. 6

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Successful Methods

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JUNE, 1921

No. 6

Breaking Ground for the Big Fight

NO international scrap since the Argonne has aroused so much interest as the pending set-to between Dempsey and Carpentier. It is easy to get up an argument on the subject almost anywhere. The day of the big fight more than fifty thousand fans will be crowded into the Jersey City arena. It would be hard to guess how many million more all over the world will await the news of the result.

But out ahead of the fight comes the construction man. First he broke ground and graded the site. Our cover shows him doing it. Now he is erecting the big arena.

And so it is before every big fight, in sport or war, in peace or business, the construction man comes first. Over in France he laid the wires, built the bridges and kept up the lines of communication and the water supply—out in front. In great industrial developments his work always comes first. On the frontier of civilization he is building roads and railroads, opening up new lands. Essentially he is always the pioneer. It takes real men to make good pioneers.

The Passing of a Pioneer

FEW engineers and contractors realize that the construction machinery business is really an infant industry. It is a pretty husky infant, but a youngster in years, nevertheless. This is brought out by the recent death at Milwaukee of T. L. Smith, who invented and made a business success of the Smith concrete mixer.

Mr. Smith produced one of the first practical mechanical concrete mixers. That was shortly after 1900. With his rare combination of inventive genius and commercial ability Mr. Smith also built up other successful construction equipment concerns.

These results Mr. Smith accomplished largely by recognizing that construction men would use quality goods if they could get them. For example, he set out, not quite twenty years ago, to build really good wheelbarrows. At that time the cheapest makeshifts of wooden-tray barrows were universally used for construction work. Mr. Smith soon proved the economy of thoroughly well-built wheelbarrows that had been actually designed for the work they were intended to do. As a result, today the company that he started does about one-quarter of the wheelbarrow business of the country, although its products are the highest

priced on the market. Mr. Smith always said that this was chiefly a tribute to the sound sense of his customers rather than to his own foresight.

In the same way, the last twenty years have seen similar developments in all types of construction machinery. It was only shortly before 1900 that Thew brought out his full-circle-swing steam shovel. Now most of the steam shovels used are of that type. Meanwhile, there has been an astonishingly rapid development in the design and in the speed of operation of shovels of all types.

It was after 1900 that Hayward started the real development of the power bucket in a way that made practicable its present general use. Similarly, the use of locomotive cranes on construction work was a real novelty as recently as 1906. The automatic air-dump car is a development of the last two decades. The gravity distribution of concrete was started about 1907, and was not acceptable to many engineers long after that.

And so it is with a long list of construction tools and equipment. American inventive genius, combined with cooperation between the manufacturer and the user, has made it possible to achieve in twenty years, or less, most remarkable progress in the development and production of equipment which cuts costs and speeds up the job. That progress is going ahead faster today than ever before. The construction machinery business rapidly is becoming one of the big industries of the country. It is such pioneers as T. L. Smith who have made and who are making this progress possible.

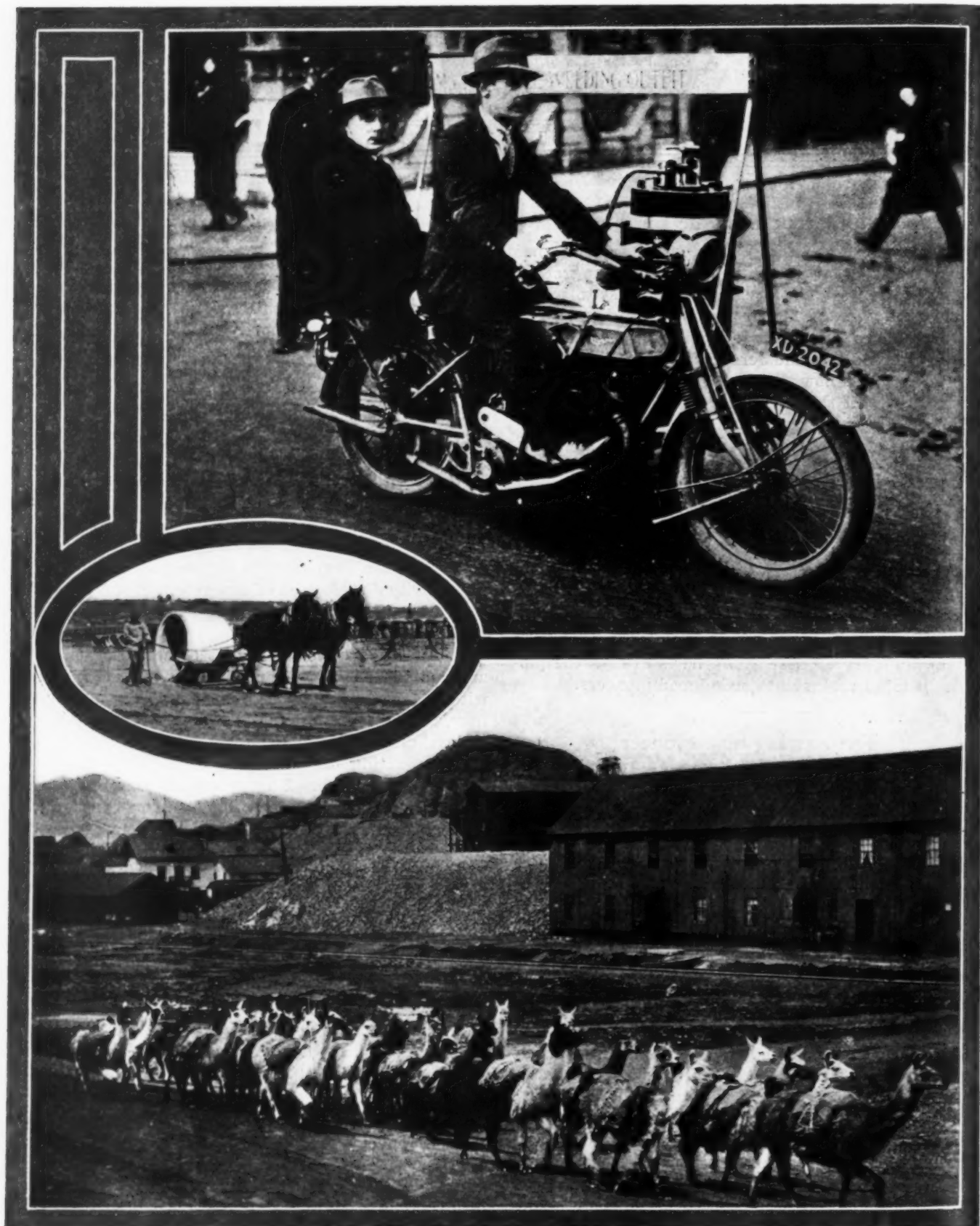
Worth Thinking Over

“DO you think things will pick up?” we recently asked A. B. Farquhar, who has been a manufacturer of heavy machinery since 1856.

“My friend,” he said, “I have been through nine or ten depressions as bad or worse than this one. Those in '57, '61, '73 and the eighties you young fellows scarcely have heard of. Business began to pick up each time just as soon as confidence was restored. There are many signs in the last few weeks of greater confidence in the immediate future. Labor has begun to recognize generally that cheap food and high wages don't go together. Business will show a response now before long.”

This opinion of a manufacturer with 65 years' business experience as a background is worth considering.

Transportation Plays Big Part

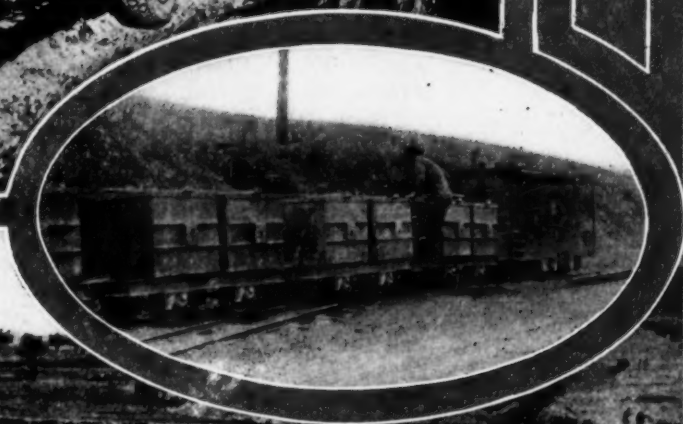
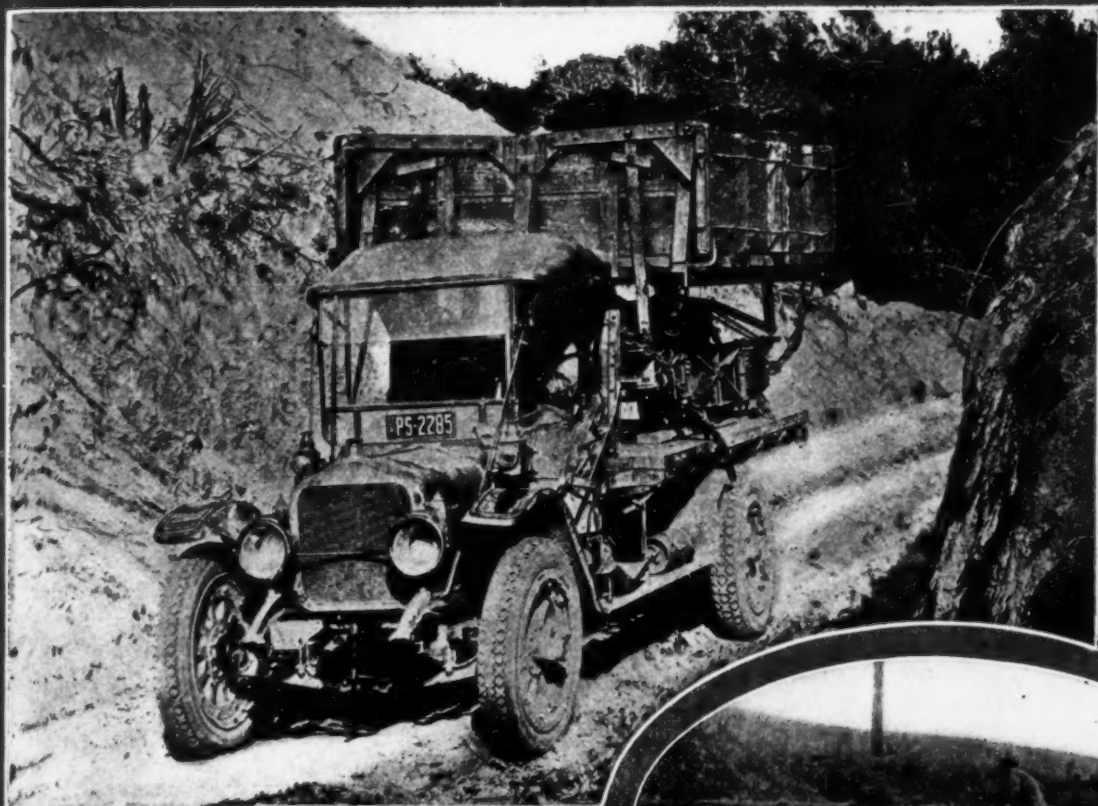


At the top—Quick service was rendered by this oxy-acetylene welding outfit mounted on a motorcycle. It is a native of London. © Underwood & Underwood.

Small insert—Bent Brothers of Los Angeles haul concrete pipe this way on a job in the southwest.

At the bottom—A material train en route to the job, 14,000 ft. above the sea in Peru.

In the Construction World



At the top—Even a humble dump car takes an automobile trip now and then. This one is being moved over a California road. © International.

Small insert—Batch boxes and small cars solve the problem of getting material to the mixer when building concrete roads. The train shown in the photograph is on a job in Pennsylvania.

At the bottom—In Palestine camels and donkeys transport the road building materials. © International.

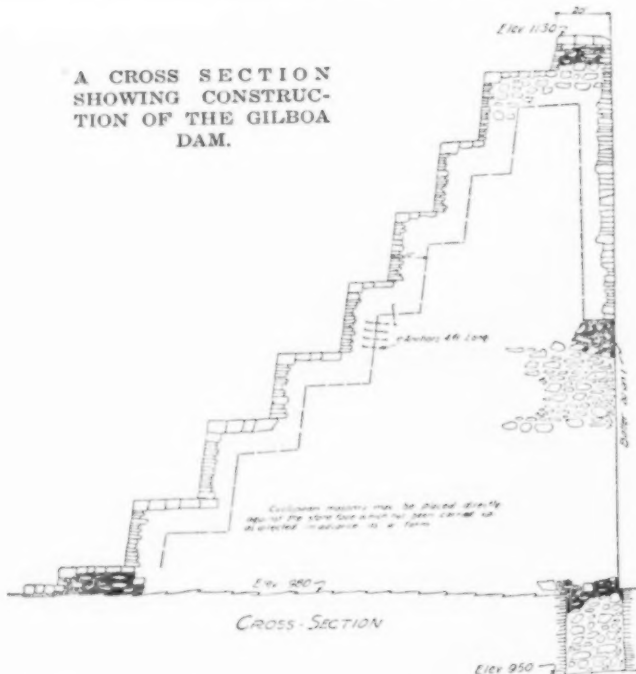
THE GILBOA DAM

Methods of Construction on Final Unit of New York City's Catskill Water Supply

IN the heart of the Catskill Mountains, not far from where Rip Van Winkle enjoyed his famous twenty-year nap, the Gilboa Dam, which is now being constructed by the Hugh Nawn Contracting Co., will round out the greatest of water works, modern or ancient, ever carried out by any city, state or nation, by impounding the waters of the Schoharie watershed to form an artificial lake five-eighths of a mile wide and five miles long. With the completion of this dam and reservoir, the great achievement of leading Catskill Mountain water over a distance of 130 miles to New York City will be accomplished.

The aqueduct itself, a great artificial channel which leads the water of the Ashokan Reservoir into New

A CROSS SECTION
SHOWING CONSTRUCTION
OF THE GILBOA
DAM.

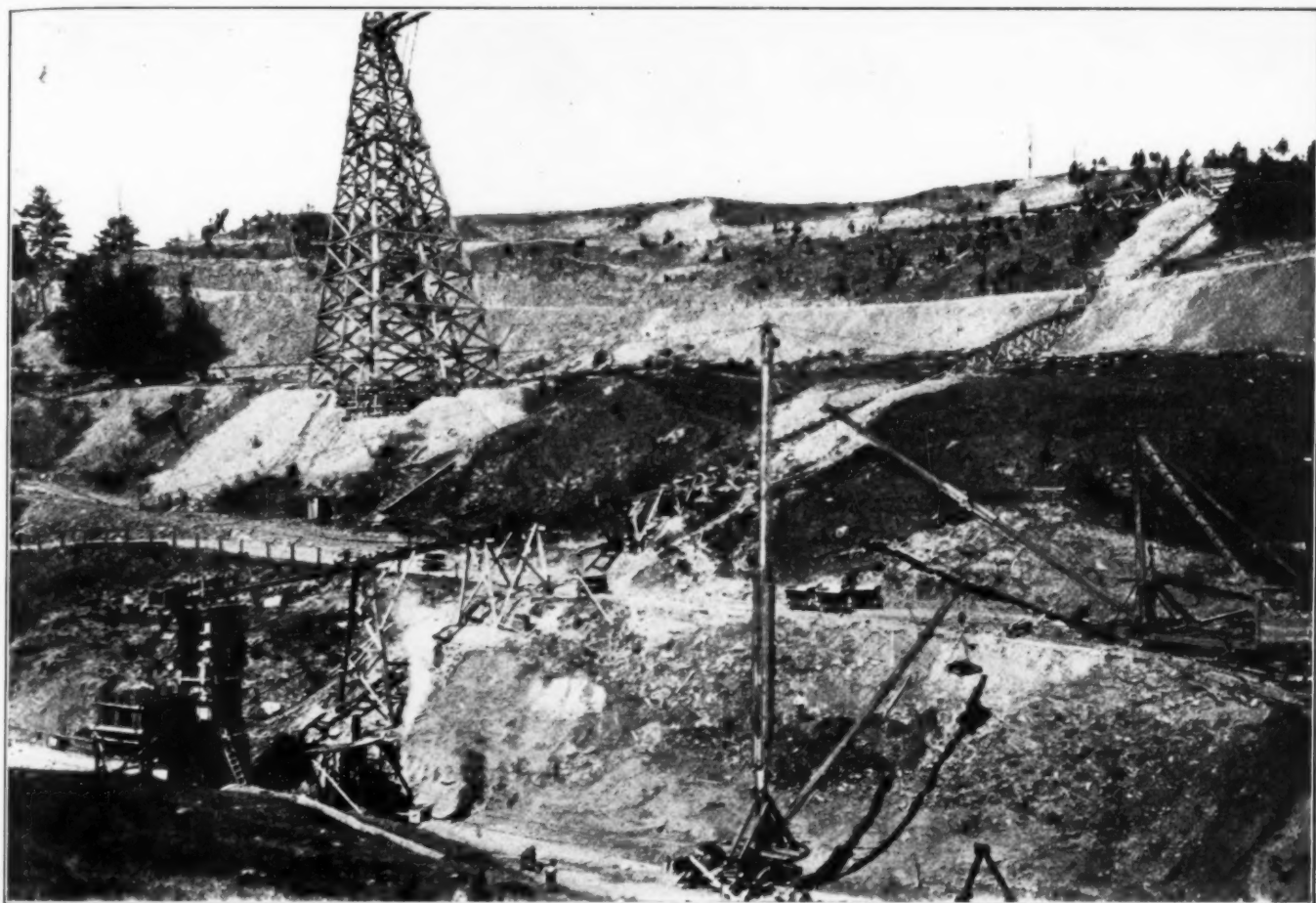


York City, is made up of several types of conduits, each one large enough for a railroad train to pass through with ease. Some portions are of plain concrete trenches covered with earth known as the cut-and-cover type. Other portions are tunnels through the mountains and hills, or beneath the broad deep valleys, while still other portions are steel or cast iron pipes. It is of sufficient capacity to deliver water at the rate of 600,000,000 gal. daily into New York City. The water impounded by the new Gilboa Dam will be led into the existing Ashokan Reservoir by means

of the Shandakan tunnel which is now under construction. The surface of the water in the new Schoharie Reservoir when full will be 1,130 ft. above



GENERAL VIEW OF DAM SITE SHOWING PART OF THE CONSTRUCTION PLANT IN PLACE, INCLUDING TWO OF THE BIG DERRICKS



A VIEW OF A PORTION OF THE WORK. THE STEAM SHOVEL SEEN AGAINST THE SKY IS EXCAVATING MATERIAL WHICH IS TO BE USED FOR THE DIKE WHICH IS TO BE BUILT IN FOREGROUND.

tide water in New York Harbor and 540 ft. above the surface of the Ashokan Reservoir. The present village of Gilboa as well as its cemetery will have to be removed to make way for this reservoir.

The dam, the site of which is shown in the photographs, consists of 1,100 lin. ft. of concrete structure, a cross section of which is shown, and 500,000 cu. yd. of earth embankment having a concrete corewall which will extend up the mountain side on the west side of the gorge as shown in the general view. In this view is also shown the concrete cofferdam and the 9-ft. steel pipe flumes which are to control the stream during construction work. The bridge spanning the stream is the old highway structure on the main Gilboa Highway, which is now abandoned for another route shown higher up the mountain side. Without going into the difficulties encountered in constructing the cofferdam and flumes in the swift running mountain streams, suffice it to say that it was built by means of sand bags used to cofferdam half the stream at a time.

The main plant used in constructing the dam proper consists of 4 guy line steel derricks having booms of 100 ft. and masts of 115 ft., handling skips of 4 cu. yds. capacity; a double elevator tower 135 ft. high supplied with concrete from two 2-yd. mixers, and a booster or auxiliary tower 180 ft. high. The derricks have removable center sections in both the mast and boom which permit the length of both mem-

bers to be reduced. Five steam shovels, one of which is seen in the upper left-hand corner of the photograph on this page, are used in addition to the derricks for handling earth and rock. Rock and other material not suitable for the permanent work are disposed of by means of the dump cars over narrow-gage track. Electric power is used throughout the job.

Among the main features of the construction plant are the cable way and aerial tramways. The former has a span of 1,900 ft., and is used to handle rock by means of 4-yd. skips over to a hopper which charges a dump car, which in turn carries rock to a rotary stone crusher. The crushed rock is fed to a belt conveyor and is conveyed to a storage pile, or direct to a material bin farther on, as desired. The storage pile is equipped with a reclaiming tunnel having five tunnel gates which permit material to be conveyed and again placed on the overhead conveyor and delivered to a bin over the mixer. The balance of the stone required will be obtained farther up the mountain side, crushed, and conveyed to the plant, a distance of 4,000 ft., by means of an aerial tramway. Cement, of which 500,000 bbl. will be required, will be hauled from Grand Gorge Station by motor truck, a distance of about 4 miles, and from that point transported 3,000 ft. to the plant by means of another aerial tramway.

The dam will contain 400,000 cu. yd. of concrete, 500,000 cu. yd. of earth excavation and 100,000 yd. of rock excavation, about half of which will be suit-

able for concrete work. The elevation of the top of the dam will be 1,130 ft. and suitable rock foundation in the creek bed is found about elevation 980 ft. There will be a concrete cut-off trench 30 ft. below the rock bed as shown in the cross-section, which is to be made by channeling and is to be filled with concrete.

Directly entering the site on the west is a swift running stream. To control this stream while the earth fill is being made and until such time as a new channel can be cut for it, a concrete culvert was constructed. Inasmuch as this stream will later be diverted, a means of closing the culvert had to be provided for. To do this, a chimney or shaft, which may be seen in the photograph on page 5 is being constructed and will be carried up to such a height as may be necessary to clear the embankment. When the new channel is ready the culvert will be filled by carrying earth



THE CRUSHER PLANT, CONVEYOR, STORAGE PILE AND MAIN TOWER

hydraulically down through this shaft to fill the barrel of the culvert, after which the shaft itself will be filled.

For making the 500,000 yd. earth fill, material excavated by means of a steam shovel is loaded into cars which dump into a bin. From this bin the material is carried down the mountain side by means of a gravity belt conveyor into a hopper at the bottom, from which point it will be placed in 4-in. layers and rolled. The same photograph shows the conveyor, as well as the shovel and bin, in place on the mountain side. This picture also shows the shaft before mentioned, which will be used to fill the culvert.

The work of constructing the Gilboa Dam was started July, 1919, and the date of completion is set for January 1, 1925. The total cost will be about \$7,000,000. At the present time about 50 per cent of the working plant is installed.

HANDLING ASHES WITH HOIST AND DERRICK

FOR some fifty miles up and down the valley from Scranton, Pa., all the mines, shops, etc., owned by the Delaware, Lackawanna & Western Railroad are supplied with electric power from their Hampton powerplant located at Scranton. This plant consists of about 9750 hp. in water tube boilers, burning the lowest grade of coal which can be used for fuel, and supplying steam for the turbo generator plant adjoining. The coal, which is so low grade as to be unsuitable for the market and would otherwise be a loss, produces an unusual amount of ash. The method of ash disposal follows:

From under the boilers the ash falls by gravity direct to the concrete ash tunnel, through which it is sluiced by a stream of water for a distance of about 50 yards into the concrete settling sump 40 ft. in diameter and about 50 ft. deep below the ground level, as shown in the photograph. From this sump the water escapes through an over-

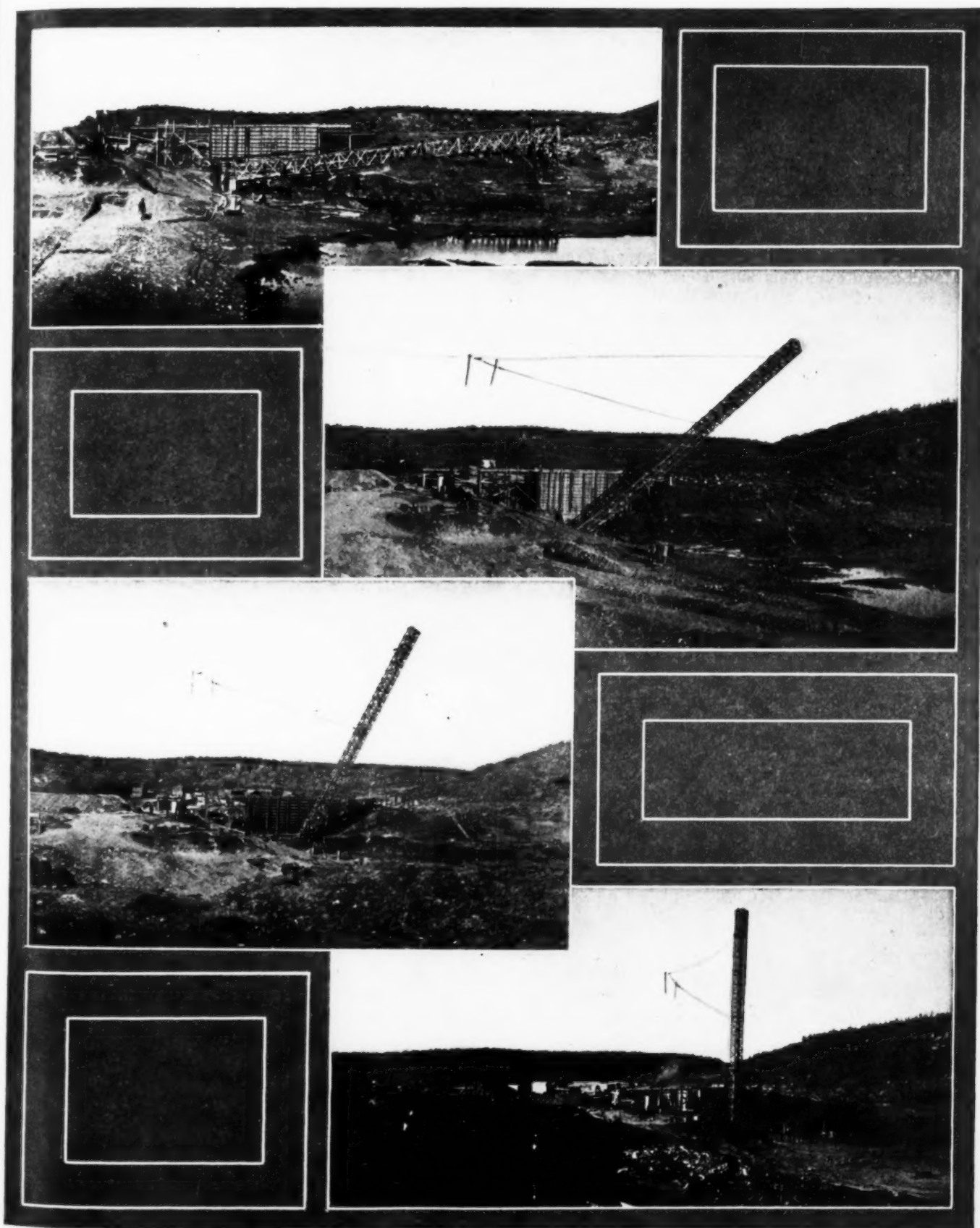
flow. The 3-drum hoist and derrick plant equipped with a 1½-yd. clamshell bucket digs the cinders from the sump and delivers them into cars on a track above the hoist, the maximum lift being about 100 ft. It is possible to handle 300 to 400 yd. in 8 hours in this manner. From the old method of handling, a lesson on gears was learned which was taken advantage of in the new installation. It was found that the cast iron gears of the old drum engine operating

continuously 8 hours daily were not strong enough to stand the racket, consequently the new hoist is equipped with solid steel gears having automatic machine-cut teeth.

The plant is in continuous operation, and when it is remembered the great number of activities it serves, it will readily be understood that the handling of the ash, which amounts to 300 yd. per day, is a vital one. This method has proved satisfactory.



The Tower Gets on Its Feet



Raising a chuting tower always is a ticklish job. This one is part of the construction plant of the Friestedt Construction Co., which is building a reservoir near Cisco, Texas.

LOADING HUMUS WITH CONVEYORS

Unusual Material Handling Problem Is Solved by New Jersey Company

BY M. D. MILLS

THE commercial production of humus in large quantities as a fertilizer has been attended, from the standpoint of the engineer, with all the difficult problems met with in a pioneer business where there has not been sufficient experience to develop a standard of practice. Several companies are successfully operating in the East, South and Middle West, but the local conditions under which the humus is mined or gathered are entirely different, resulting in no uniformity in gathering methods.

Humus is produced by the Hyper-Humus Company for two different purposes. First, in the natural state, containing approximately 60 per cent of moisture, it is sold extensively for the building up of fine turfs on golf courses and lawns, possessing as it does a high content of nitrogen, organic matter and a large water absorbing capacity. The second and largest use of the product is as a base for commercial fertilizers on account of the high ammonia content, the absorbent qualities of the humus and organic matter. It is, when sold for this purpose, dried down to 15 per cent moisture. The drying process consists of passing the humus through rotary kilns or drums, the evaporation being effected by the application of direct heat.

The company's humus deposit at Newton, N. J., consists of more than 1000 acres of old lake bottom about $3\frac{1}{2}$ miles long by $\frac{3}{4}$ mile wide and with a depth varying from 6 to 20 ft. over the entire property. The drying plant is located at one end of the deposit on account of the proximity at this point of two railroads.

Before the humus can be gathered it is necessary

that it be drained, and to this end a main drainage canal which empties into the Delaware River has been dredged lengthwise through the center of the deposit. From this main canal a series of lateral ditches have been constructed over that part of the deposit that has been developed. The ditches are 75 ft. apart and run to the edge of the property. The deposit is, therefore, divided into a series of fields 75 ft. in width and from 800 to 2000 ft. in length, the present development being only on one side of the drainage canal.

The aim of the gathering operation is to produce humus of the highest quality as well as the lowest possible moisture content. Each field is frequently disked or opened to a depth of from 6 to 8 in. by the use of a standard cutaway disc drawn by a tractor. This frequent disking, carried on over a period of about three months or more, causes the material to gather bacteria from the air, thereby increasing the nitrogen content and also permits the maximum possible evaporation by sun and wind. Under average weather conditions during the summer the moisture content reaches about 60 per cent.

The factors in the gathering problem that limit the types of machinery which can be used are:

First—The peculiar shape of the individual fields, which, as stated above, are 75 ft. in width and from 800 to 2000 ft. in length.

Second—The necessity of gathering the prepared humus to a depth of from 6 to 8 in. only, as well as leaving the surface of the stripped field in a reasonably level condition.



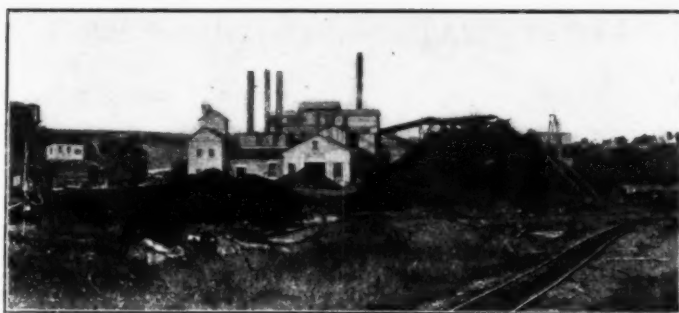
ONE OF BIG HUMUS FIELDS SHOWING CARS, CONVEYOR AND MEN

Third — The character of the deposit which, varying from 6 to 20 ft. in depth and composed of 80 or more per cent of water, presents a difficult flotation problem for machinery, especially in rainy weather. The tractor, having a weight of 4 lb. per sq. in., has no difficulty in staying up, but any machine exerting a greater pressure cannot operate under all conditions which must be encountered.

During the gathering season from May 1 to November 6, 1920, a solution was effected by the use of portable field conveyors made to meet special requirements and mounted on light railway trucks.

Each of these conveying machines, which are an improvement on all prior methods of gathering, consists of a standard 60 ft. section of 18 in. belt conveyor mounted on two swiveling trucks, over which the humus is delivered by way of a 12 ft. elevating section into light railway cars. The loading of the conveyor is, of course, done by hand, this presenting an undesirable feature in the necessity for a large force of labor. The company is now studying methods of gathering with machinery which will partly eliminate this feature. The power is delivered by pole line from the company's powerplant to various points on the fields from where thousand foot flexible cords carry the current to the machines.

The machine is run laterally down the fields loading the humus into dump cars on portable "loop" tracks which are laid on the ditch banks of every second field. Portable track sections are used to carry the machine, and when one field is stripped the machine is turned



THE PLANT WITH ITS BIG HEAPS OF HUMUS PILED BY CONVEYORS.

around into the next field, on which it returns.

The transportation of the humus from the field to the plant is effected by the use of an industrial railway. A permanent track is maintained along the bank of the drainage canal, from which portable tracks are laid along every second ditch bank to the back of the property, forming a series of

"loop" tracks. This portable track layout permits an empty train to be pulled to the field conveyor over one track and the loaded train to be pushed out over another, insuring a continuous supply of empty cars. The portable track used is built with pressed steel ties, which take a firm hold in the humus and maintain a fairly uniform track. Joint ties have been used this past season in place of fish plates and have cut the tracklaying cost in half.

On the arrival of the humus at the plant it is either loaded direct into box cars, put in a 400-ton bunker above the drying plant, from where it is fed to the dryers or placed into storage for winter. The humus is handled over one conveyor system in any case.

The main conveyor discharges on to a reversible 18-in. shuttle conveyor 30 ft. in length, mounted on a track to permit its movement from end to end of the bunker. With this shuttle conveyor it is possible to fill the bunker at any point. In addition, when extended to one end of the bunker the shuttle discharges on to a temporary storage conveyor, from which 8000 tons were piled last fall. At the opposite end of the bunker the shuttle discharges to a loading conveyor from which the humus is chuted into box cars.



THIS PHOTOGRAPH SHOWS ANOTHER PART OF THE SAME FIELD AND ANOTHER CONVEYOR.

ROAD WORK IN MICHIGAN

Five Car Trains Make $3\frac{1}{4}$ Per Cent Grade Easily on Job at Lapeer

A NARROW gage railroad beginning with a 1000-ft. climb up a hill with a $3\frac{1}{4}$ per cent grade is the method of getting materials to the mixer adopted by the Handyside Construction Company of Detroit on a 2.16 mile concrete road job at Lapeer, Mich. The road which is being paved extends due east on the present pavement of the main street of the town on the route to Imlay City, and the first 1200 or 1500 ft. with the paver at the top of the hill may be clearly seen in the photograph at the bottom of this page. In addition to the 2 miles of road 5000 sq. yd. of city pavement are to be laid as part of the work.

The sand and gravel are received over the Michigan Central Railroad at a switch about 500 ft. south of the point at which the new road begins. The tunnel trench at the material yard first was excavated and floored over at ground level. Materials are unloaded by hand shovels and flow by gravity into the batch boxes on the cars in the tunnel. The work is progressing at the rate of about 250 ft. per day, about 120 cu. yd. of concrete being mixed per day.

The specifications call for a pavement 20 ft. wide, 7 in. thick at the sides and 8 in. thick at the center.

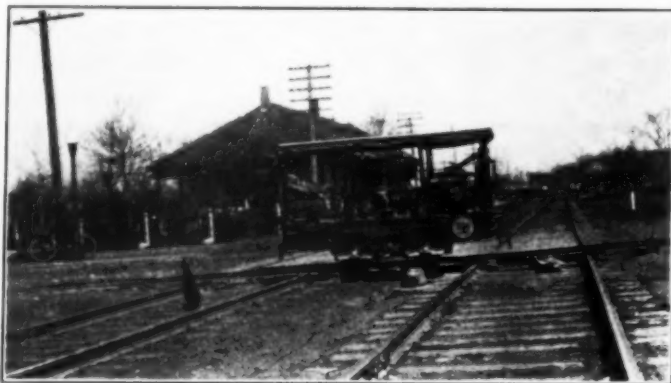
The unloading requires 8 to 10 men who also take care of handling the cement. Two batch boxes of 25 ft. capacity are carried on each car and 5 cars per train are hauled, two locomotives handling three trains. A locomotive is not used to spot cars at the mixer.

Although the trains weigh approximately 20 tons exclusive of the locomotive, which is a considerable overweight for a $3\frac{1}{2}$ -ton locomotive on such a grade, they are being handled successfully and making a speed on the upgrade of $2\frac{1}{2}$ miles per hour.

About half way to the mixer the narrow gage railroad crosses the Michigan Central tracks. Two

of the 15 ft. narrow gage sections are removable, one over each of the railroad tracks. One of these sections is taken out whenever a train is due to arrive and accidents are guarded against by the employment of a watchman, red flags at proper distances, and special instructions to the train crews.

When the cars reach the mixer the man who fires the mixer boiler uncouples the car with its two batches, pushes it under the batch transfer on the mixer and then couples up the empties. When a train load of boxes has been unloaded, it is allowed to coast down



WHERE THE NARROW GAGE CROSSES THE MICHIGAN CENTRAL TRACKS.



THE 1000 FT. UPHILL HAUL. THE MIXER MAY BE SEEN IN THE DISTANCE.



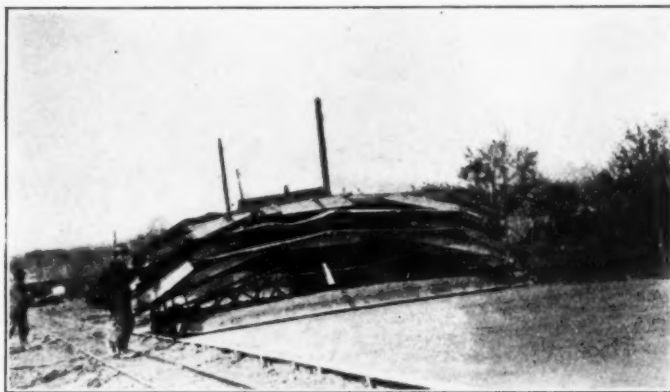
PULLING A FORM STAKE AND ALL.

to the foot of the hill where a passing siding has been installed, thus avoiding delay to the loaded trains. Brakes are provided for the coaching operation with 2 x 6's used as breaking levers.

The photograph above shows Mr. Handyside's method of taking up forms. He does not use the usual form stake puller but pulls the form, stake and all. The stakes, as well as dirt or concrete on the forms, are

easily removed after the form is laid on the finished road.

Another little scheme which Mr. Handyside is working is to use his finisher as a truck for hauling the canvas and tar paper covered forms which he uses to protect newly finished pavement from sun or rain. The photograph below shows the finisher climbing the hill with three of these sections piled on it.



FINISHER LOADED WITH FORMS

GRADING DIRT ROADS IN IOWA

A GOOD example of efficient machine grading may be found in a road job being done in northern Iowa by Mantry Peterson, an Omaha contractor. The road runs south from Elmore, which is close to the Minnesota line.

A standard elevating grader equipped with a 40-



AFTER THE GRADER HAS PASSED.

in. carrier, 4 in. wider than the standard, is used on the job. This extra width increases the carrying capacity, and by lessening the friction of the earth upon the sides of the conveyor, reduces the amount of power necessary.

The grader is pulled by a tractor and the excavation runs about 10,000 cu. yd. to the mile. The haul is short and 8 dump wagons are used.

It is rather remarkable that it was possible to start this work in March, at a time when there was still from 4 to 6 in. of frost in the cuts. The powerful tractor-drawn machine broke through and elevated huge chunks of frozen gumbo, so large that they would

not go into the wagons. Later the machine was operated in low ground, taking out ditches and casting the material into the center of the road. After the first plowing had been taken off, a soft wet material was encountered which would have bogged a team and wagon, but the machine went through it and handled it as if nothing had happened. At no time was it necessary to throw the tractor into "low."

One of the illustrations shows a 3400-yd. cut which was taken out with this machine in three days. The slope left by the grader shows that the operator understood his business.

The piles of dirt dumped from the wagons are lev-



LEVELING OFF THE EARTH DUMPED BY THE WAGONS.

elled by means of a "mormon" scraper. The grade then is finished by going over it with two road graders with 8-ft. blades, one pulled as a trailer. An interesting fact is that this work of finishing is done while the outfit is going to and from the camp, morning, noon and night, and, therefore, practically without expense.

C. H. LOCHER, CONSTRUCTION MANAGER

By S. T. H.



GOOD detail men are usually good at detail only. Few executives can handle minor problems of a business well. Now and then there is a man who can keep in touch with the small details while he is holding the main job in hand. C. H. Locher is a construction manager of that type.

No man on his jobs ever knows any more about what each piece of equipment can do than Charlie Locher, as his friends call him. He can tell with his back turned what a shovel runner is getting out of his machine. He is an expert on the use of every class of construction equipment. He knows all his foremen personally. Many of his laborers have followed him all over the country. And still Charlie Locher keeps the big administration and financial problems of his jobs right in hand.

Back in the days of the Chicago Drainage Canal a lot of contractors had their eye teeth cut. One of these was Charlie Locher. He was up against excavating material from a wide, deep channel and delivering it to a spoil bank back of a broad berm. Existing cableway designs required the skip to be lowered to the ground so it could be unlatched by hand. Locher saw that he was going broke unless he could eliminate the delay involved in unloading the skip. Working with the engineers of a cableway manufacturing company, he devised the aerial dump for cableway skips that is now in general use throughout the world.

On many of the jobs which Mr. Locher has handled he has in a similar way worked out methods or machines to solve problems by studying carefully what he was up against and then striking directly at the

solution in the simplest way. Probably he is best known for his work on the West Neebish Channel of the Saint Mary's River, below Sault Ste. Marie, Mich., and on the Livingston Channel of the Detroit River.

At Sault Ste. Marie the Government planned the straightening and deepening of the short river which connects Lake Superior with Lake Huron. This comparatively unknown stream carries one of the greatest volumes of traffic of any waterway in the world. The straightening process involved a channel of about 300 ft. wide and a couple of miles in length through solid rock. The water varied from 6 to 12 ft. in depth over the site, with a stream width of half a mile.

All of the bidders on the job figured that they would handle the work with under-water excavation. Locher was a comparatively new man at work of this magnitude under these conditions, although he had handled many jobs involving as much or as great quantities. As usual, he studied the proposition from every angle. Then he figured out that the site could be unwatered with cofferdams. This was possible because the existing channel was on the other side of an island in the middle of the stream. The idea required a cofferdam upstream about half a mile in length, with one at the lower end of the job of nearly as great a length. The area enclosed between these two cofferdams was nearly two square miles. Nobody ever figured up how much water had to be pumped out. Anyway, Locher built the dams, unwatered the job and completed the work with a good profit at about one-half the price made by the other bidders, who expected to use marine methods.

On this Sault Ste. Marie job Locher was practically never off the work day and night. He pushed operations summer and winter with two ten-hour shifts, although the thermometer was frequently below zero for weeks at a time, and occasionally was down to 30 and 40 below. He personally worked out a lot of original ideas in the type of plant and the methods used to meet the new conditions that he was up against. His success was attributable largely to the fact that he kept his eye on the ball and personally studied out how to solve many such problems as the risk of all of the upstream cofferdam being lifted bodily by an ice jam.

Most of the old heads among the lake contractors felt Locher's Sault Ste. Marie job was a "flash in the pan." Not so with Locher. Almost before he had finished at Sault Ste. Marie he slipped down below Detroit and bid off a section of the deepening of the Livingston Channel in the Detroit River. Here, again, his only competitors were concerns that were bidding with the idea of handling the job with marine methods. Locher practically duplicated the general layout at Sault Ste. Marie. Not only that, he floated his whole plant down the lakes and used it right over again.

But in the Detroit River Locher was up against some new conditions. The limestone rock bottom in places looked like a coral bed. Water came through as it would through a sponge. No pumps that had ever been built could keep the cofferdam unwatered. Locher got the solution with air lifts. He pumped enough water daily out of that cofferdam to make a river. He kept the job unwatered, completed it well within his time limit, and again he made a good profit.

These two jobs give a good idea of how Charlie Locher works. Before he tackled them he was on big jobs more or less all over the Eastern and Central states. After the Detroit job he went west into partnership with Grant Smith at Seattle. This combina-

tion handled many big projects in the Northwest and in Canada. Then they drifted into New York, where they tackled several sections of the part of the Catskill Aqueduct under Manhattan Island. It was common talk among the big eastern contractors that these western fellows, used to working in unlimited range and under frontier conditions, would be wiser before they finished their New York job. Maybe so. Anyhow, the concern did this great work with eminent satisfaction to everyone concerned. Their head-houses for their shafts were in all cases limited to about the area that would be covered by a pocket handkerchief. On lower Fifth Avenue they actually had a head-house on the site of a monument to one of the Civil War heroes, who was nicely set away in some corner until the job could be finished, when he was put back on his pedestal undisturbed.

After the big New York work was finished Locher was mixed up in several other important projects. Then he decided he had done enough—and some of his friends said that they thought he had made enough—so he went down to his old home in Virginia to develop some of the schemes that he had had in mind since boyhood. He built a good-sized water-power plant, a clay-products plant and several other projects just to amuse himself. But in some way the lure of the old game called him so that he succumbed to the chance to become construction manager for the Miami Conservancy District. The accompanying photograph shows him, as usual, out on the job "jest a-lookin' aroun'," on one of the several big dams included in that great project. It is safe to say that Locher knows every hoisting engineer, every dinky skinner and every foreman on the job. It is also safe to say that he knows just what every plant does every day and what it ought to do, but along with it all Locher has the broad view of the whole scheme which he knows can be made a success only if the details work right.

RAISING YARDS WITH DUMP CARS

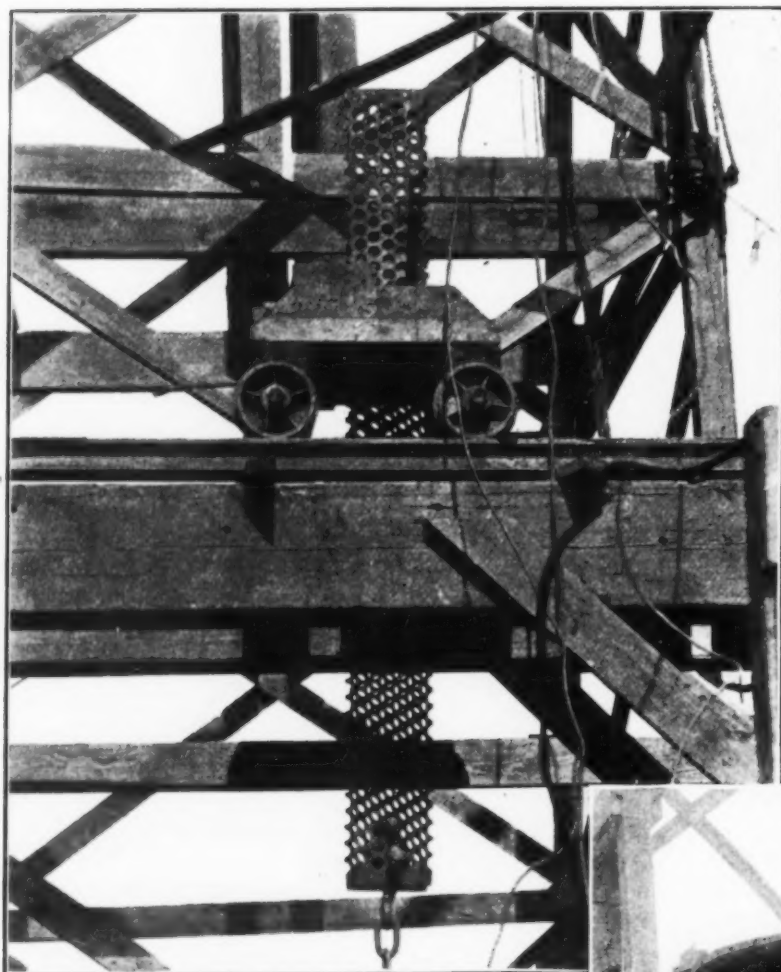
DUMP cars of 6 cu. yd. capacity are being successfully employed near Davenport, Iowa, in making a shallow fill, dumping from a level. The Western States Portland Cement Company is building a modern, wet-process plant near Davenport and is using the material stripped from the quarry for a shallow fill, to bring the yards up to the required grade. This material is loaded into the dump cars at the quarry site and then taken around to the other side of the yards, where the cars are dumped from a level track. The illustration shows a train which has just been dumped and is pulling out. After dump-

ing, the material is levelled with a spreader and the track shifted over.

The method of shifting the track is of especial interest, as an ordinary stump puller is used for the purpose. A long cable is anchored securely to "dead men" at intervals of about 50 ft., paralleling the track. An attachment from the track can be hooked over the cable anywhere. Two hitches are used on the track, about 15 ft. apart. The ties are first jacked up out of the mud and then the stump puller is hitched on. It is necessary to regage the track occasionally, but considerable labor is saved.



GRAVEL PRODUCTION IN AN INDIANA PLANT



which pulls the industrial cars is operated by electricity, the power coming from the city power plant in Lafayette.

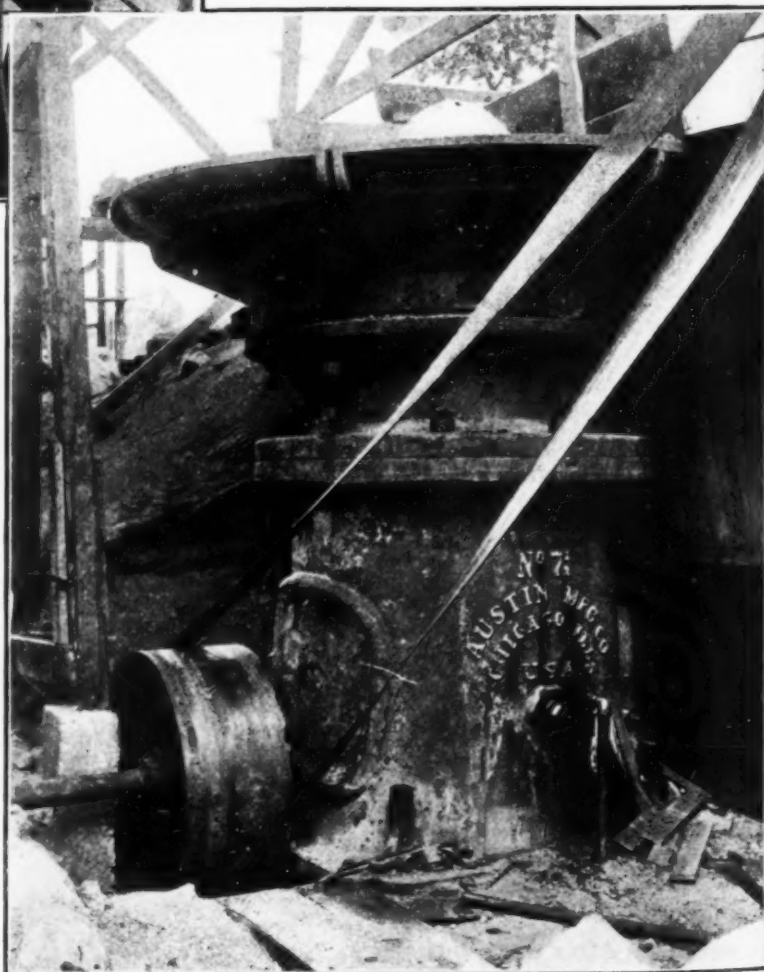
The crushing plant itself is well equipped with a large gyratory crusher which is shown in one of the photographs. The bank run gravel is dumped directly on to the grizzly, through which it is passed to the conveyor. Anything over 4 in. is by-passed to the gyratory crusher, from which it is transferred to the conveyor. The fine material goes directly into the washing plant and the remainder for further screening and crushing before being washed. The final preparation of the various grades and mixtures is completed in the washing plant.

The standard gage railroad tracks pass under the washing plant. The material is held in hoppers and discharged from them directly into the cars.

The upper photograph on this page shows a little truck that is mounted on rails directly over the crusher. It is used for hoisting and moving parts and is extremely useful when repair work has to be done.

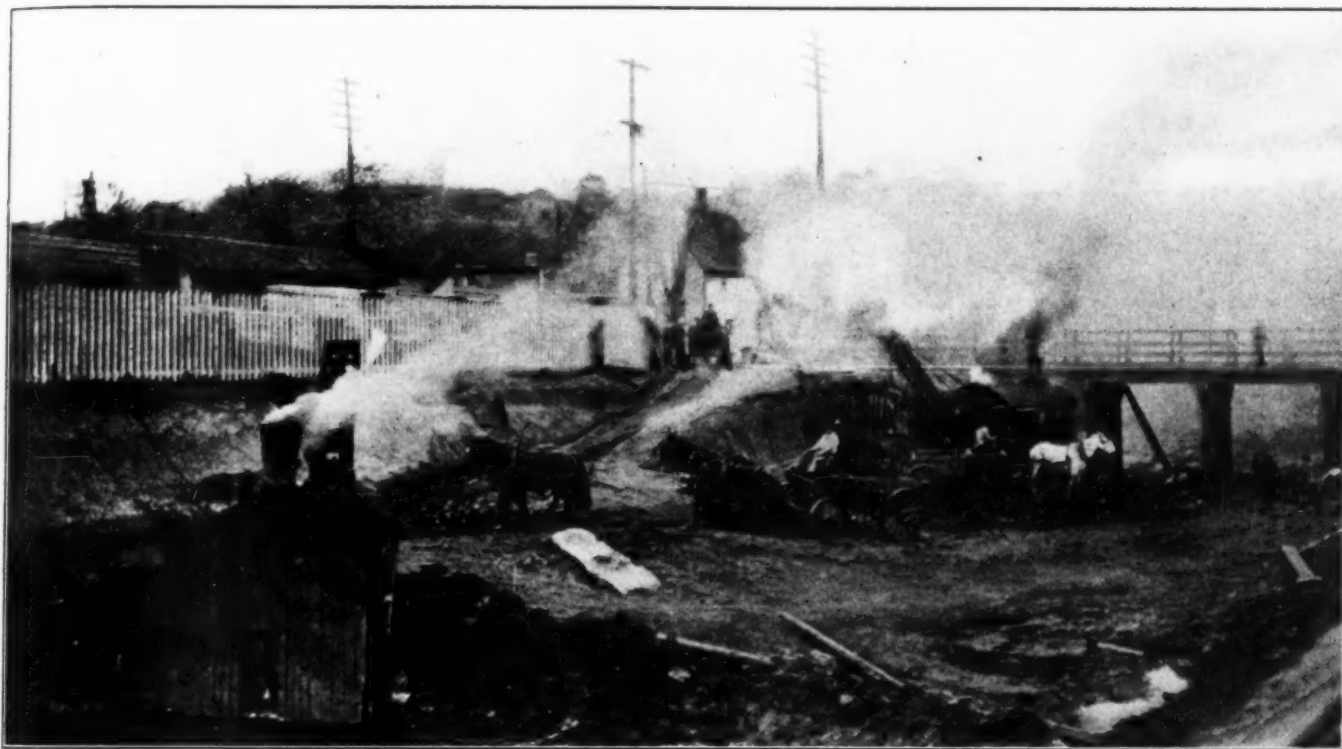
A MAN, a shovel and a wagon used to be all that was necessary in the way of equipment for a gravel plant. But the modern gravel plant presents an entirely different picture with its power shovels which take out 7 or 8 cu. yd. a minute, its industrial cars that carry the excavated material to the crusher, and the well-planned track layouts which enable the gravel producer to get his product to the railroad cars and on its way to the consumer with the least possible delay and trouble.

A typical mid-west gravel plant is that of the Lafayette Hydraulic Company at Lafayette, Indiana, which is working a bank about half a mile back from the shore of the Wabash River. This plant has a capacity of about 50 cars per day. The gravel stratum is about 40 ft. in depth and is covered by an overburden of $2\frac{1}{2}$ ft. The overburden is removed by the hydraulic method. Two 750-gal. centrifugal pumps bring the water from the river for this purpose. All of the machinery except the shovel and the engine



A TRAFFIC COP ON THE PAYROLL

Kansas City Contractor Finds Solution of a Vexing Problem



TWO STEAM SHOVELS IN ACTION. THE TRAFFIC COP MAY BE SEEN STANDING ON THE BRIDGE

KEEPING traffic going and conducting a construction operation at the same time is a problem which has vexed many a contractor. The W. D. Boyle Construction Company of Kansas City, Mo., solved one phase of it, however, on a job at Rosedale, Kan., a suburb of Kansas City. The work consisted of straightening out a stream and making a ditch 2470 ft. long, 100 ft. wide and 16 ft. deep, involving the removal of about 70,000 cu. yd. of material, which task was accomplished in two months. At one point the new ditch cut through a much traveled street on which was a trolley line.

One-half of the width of the original road was excavated first, all traffic being transferred to the other half, and then a temporary bridge was constructed and tracks and traffic diverted to it while the other half

of the road was being excavated.

Mr. Boyle decided that the way to insure the least amount of trouble was to have a traffic policeman on the job all the time. He therefore went to the Chief of Police of Rosedale and asked him to appoint three traffic policemen to work in eight-hour shifts, promising to pay their salaries. As a result the traffic was handled by men who were acting in an official capacity and who also had the interests of the contractor at heart because of the fact that he provided their pay. Whenever the construction operations required that traffic be held up for a minute or two, the policeman on duty was pretty sure to see that the traffic was kept well out of the way and that the contractor was permitted to pursue his work unmolested. It is a little plan that other contractors might well try.

LUMBER WASTED FOR SCAFFOLDING

EUROPEAN construction methods sometimes contain features of practical interest to the American builder. One of these which first meets the eye and one that should teach a lesson is the method of scaffolding which is almost universally used. Instead of the thin boards of new lumber nailed together for scaffolding jobs, as is done in the United States, thick planks, which from their appearance have seen much service, are lashed to sturdy poles and used. The planks, poles and ropes are used on job after job from year to year. This method effects a vast saving in lumber.

A CENTRAL MIXING PLANT

THE idea of the central mixing plant has been developed by Joseph Zuckorhaus of Philadelphia until now, it is reported, he is prepared to deliver mixed concrete in motor trucks to any part of Philadelphia for any purpose. The mixing plant is located on the banks of the Schuylkill River, where he receives sand and gravel by barges which are unloaded by conveyors. A silo is used to store bulk cement. The principal object of this plant is to supply paving contractors of the Philadelphia district with wet concrete, and, so far as can be learned, this system meets with the approval of the engineers.

HAMMER-HEAD CRANE ON BUILDING
CONSTRUCTION

IN this country when we think of hammer-head cranes we usually have in mind the huge stationary affairs used in the big navy yards. Not so in Switzerland. The accompanying picture shows a small traveling hammer-head crane on a building job in that country.

The crane shown here is mounted on traveller wheels. It has a light structural steel

tower about like a tower on a concrete chuting plant.

On top of the tower may be seen the horizontal boom which swings in a full circle.

Situated in the operating cabin at the base of the tower is the hoist and the traveling mechanism. This particular crane is electrically driven. Steam drive is also used for cranes of this type, which are not uncommon in Switzerland. Light hammer-head cranes also are used considerably in other continental countries.

PULLING A PIER TO PIECES

THE photograph with this article shows the manner in which Merritt & Chapman are wrecking an old wooden pier on Staten Island, to make way for a new concrete and steel municipal pier. Steel cable is made fast to the timbers which are literally snatched loose, hauled a distance of two or three hundred feet, and deposited on the scow which is seen on the other side of the finished wall.



USING A STREET WITHOUT ABUSING IT

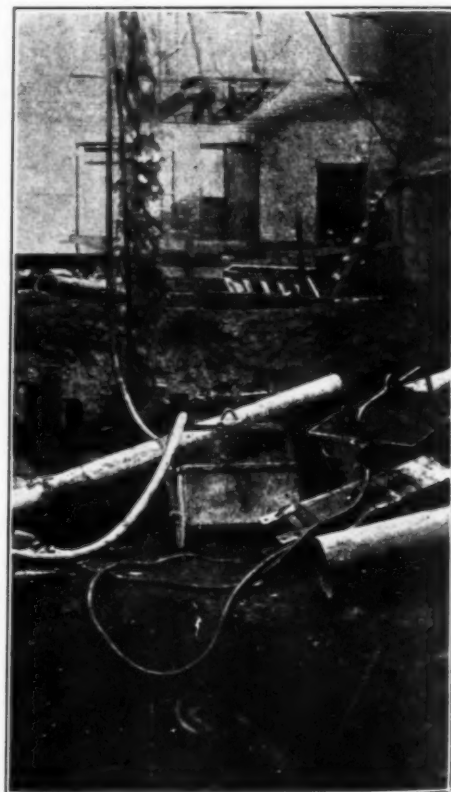


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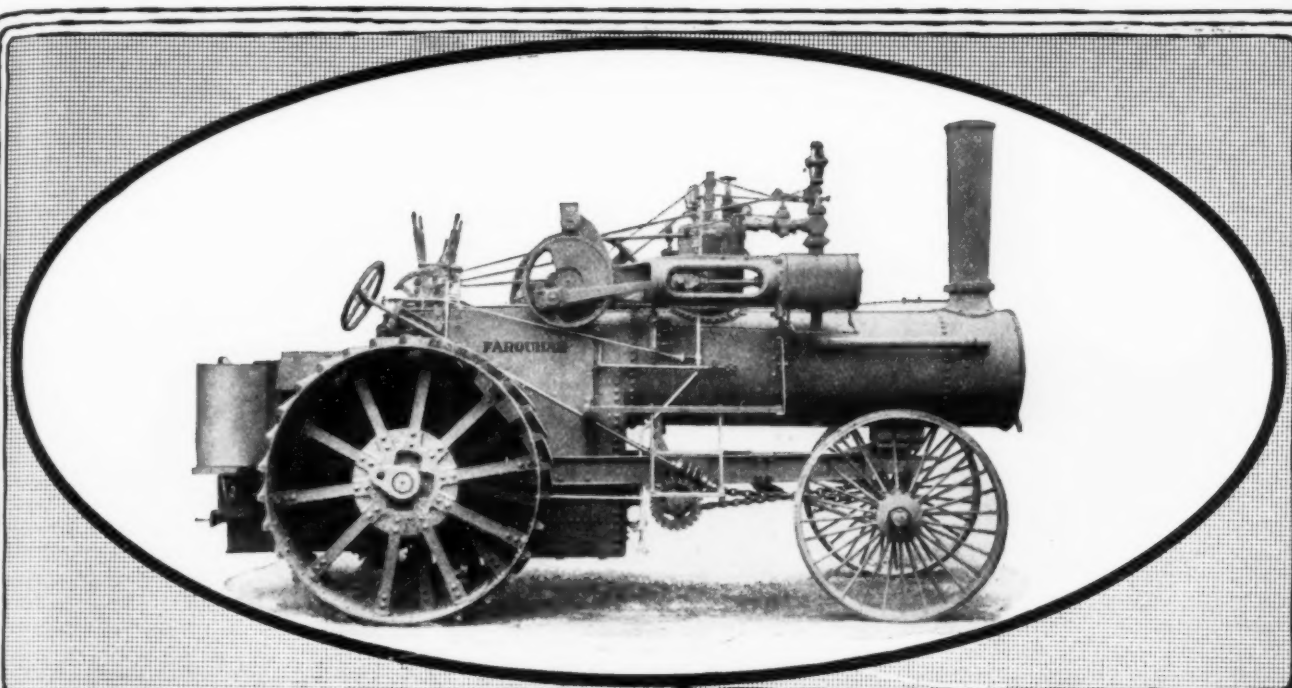
THE accompanying photo shows how Geo. Colon & Co. manages to place a dead man in a New York City street to guy a derrick which is in the lot on the right. The surface of the street is not impaired; the dead man being held down by rock piled upon it. Street clearance is maintained by means of the A frame set against the pile of rocks.

STEEL TUBES TO ROCK

SHOULD one be passing 120 Cedar Street, New York, at the time when one of the steel tubes, which is part of the foundation system used by Spencer, White & Prentis, is in action, the impression might be gained that an oil gusher had been "brought in," in the heart of Manhattan. This system of foundation which is rapidly finding favor is shown in the accompanying photograph, and consists of 10, 12 and 15 in.



steel tubes, which are driven by a pneumatic hammer to rock or the desired penetration. The core of earth is blown out, as shown, by means of compressed air explosions. After the core of earth is removed, the tubes are then driven further, if possible, to insure a proper bottom. Then they are filled with concrete.



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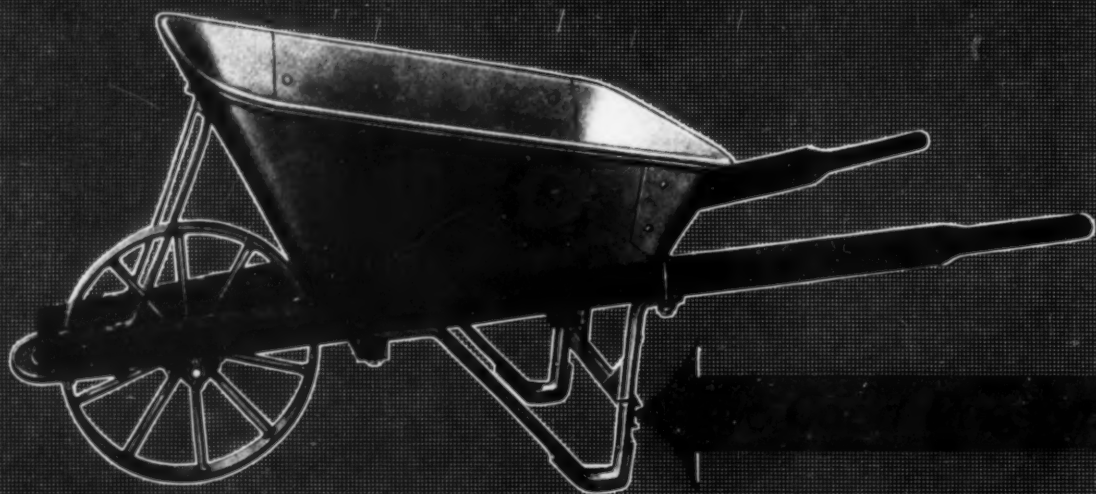


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